

**BLOCKED MERCAPTOSILANE COUPLING AGENTS FOR FILLED RUBBERS**

**CROSS REFERENCE TO RELATED APPLICATION**

This is a division of co-pending Application No. 09/284,841, filed April 21, 1999, *pat no 6,414,061*  
which is a 371 of PCT/US98/17391, August 21, 1998, which claims priority to U.S.

5 Provisional Patent Application No. 60/056,566, filed August 21, 1997.

**FIELD OF THE INVENTION**

This invention relates to sulfur silane coupling agents which are latent, that is, they are in a state of reduced activity until such a time as one finds it useful to activate them. The invention also relates to the manufacture of rubbers including inorganic fillers and these silane coupling agents, as well as to the manufacture of the silanes.

**BACKGROUND**

The majority of art in the use of sulfur-containing coupling agents in rubber involves silanes containing one or more of the following chemical bond types:  
S-H (mercapto), S-S (disulfide or polysulfide), or C=S (thiocarbonyl). Mercaptosilanes have offered superior coupling at substantially reduced loadings; however, their high chemical reactivity with organic polymers leads to unacceptably high viscosities during processing and premature curing (scorch). Their undesirability is aggravated by their odor. As a result, other, less reactive coupling agents have been found. Hence, a compromise must be found between coupling and the associated final properties, processability, and required loading levels, which invariably leads to the need to use substantially higher coupling agent loadings than would be required with mercaptosilanes, and often also to the need to deal with less than optimal processing conditions, both of which lead to higher costs.